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# Grand Challenge Problem 2: Adaptive Awareness for Social Regulation of Emotions in Online Collaborative Learning Environments

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## Abstract

Students' ability to understand and manage emotions in self and others plays an important role in the success of collaborative learning. In online learning environments, the access of socio-emotional cues is reduced, and this may lead to a lack of emotion awareness that could be detrimental to collaboration and learning performances. The project we present here aims at substantially improving learning effects with social media through the use of adaptive emotion awareness technology designed to support students' emotional regulation in online groups.

**Keywords:** Computer-supported collaborative learning, affective computing, emotion awareness, emotino management, multi-modal interaction

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Students' ability to understand and manage emotions in self and others plays an important role in the success of collaborative learning (Järvenoja and Järvelä 2009; Lajoie et al. 2015; Lavoué et al. 2015). In online learning environments, the use of new social media technologies (blogs, forums, wikis, social networking sites, etc.) facilitates connections between learners, but may also introduce new communication challenges. Moreover, the access of emotional cues (e.g., interest, workload, stress, anxiety) is reduced in such environments. Online collaborative learners may therefore experience difficulties in evaluating their partners' emotions and adjusting their behavior in response. A lack of emotion awareness among online learners may have a detrimental effect on collaboration and learning (Eligio et al. 2012). It may also lead to inappropriate or even dangerous social behaviors such as cyber-bullying. This project aims at substantially improving learning effects with social media through the use of adaptive emotion awareness technology (Chanel et al. 2013; Ringeval et al. 2013) designed to support students' emotional regulation in online groups.

## Problems of the European Education System Addressed, and Long Term Benefits for Society

The increasing use of social networking sites introduces new social problems such as cyber-disinhibition and cyber-bullying that interfere with school and learning. Such problems are based on failure to address the development of socio-emotional skills in school curricula. A new pedagogy is needed that is based on self-regulated, experiential learning in groups where learners are supported to achieve a deeper understanding of self in relation to others. In order to contribute to the goal of building emotion-centered learning programs, research should focus on the investigation of how awareness tools can be adapted to support the social regulation of emotions in online learning contexts (Molinari et al. 2013).

## Main Activities to Address the Grand Challenge Problem

There will be five main activities:

1. Selection of a population of learners involved in online collaborative learning experiences. An assessment will be conducted targeting learners and groups of learners with emotional regulation problems.
2. Investigation into the role of emotions in online social learning environments. The output will be a range of emotions identified as playing a significant role in the success of collaborative learning.
3. Development of methods to identify learners' emotions in real time during online collaborative learning. These methods will be based on a multimodal dynamic analysis approach including signals from users (e.g., facial expression, speech, eye movements, physiological data) and contextual information. A focus will also be on how co-learners' emotions evolve over the course of their interactions.
4. Development and implementation of adaptive emotion awareness systems. To be efficient, they should promote the sharing of emotions identified as beneficial to collaborative learning at the proper time during interaction.
5. Evaluation process of systems developed in (4) and with participants selected in (1), using the following criteria: users' acceptance; capacity to enhance mutual emotion awareness and collaborative learning; capacity to help students deal with emotional issues in online social learning environments.

## Timeframe for the Grand Challenge Problem

The proposed Grand Challenge Problem could be solved in a timeframe of 4 years: 6–12 months for Activity 1 (Year 1), 24 months for Activity 2 (Years 1–2), Activity 3 (Years 2–3), Activity 4 (Years 3–4), and 12 months for Activity 5 (Year 4).

## Measurable Progress and Success Indicators:

1. Development and validation of models for the investigation of the dynamics of emotions and their regulation in computer-supported collaborative learning (CSCL) contexts.
2. Development of adaptive emotion awareness systems for various types of CSCL environments, implementation of studies to assess their acceptance and usefulness in laboratory and authentic settings.
3. Higher emotion awareness, better collaborative processes, and learning outcomes in CSCL settings.
4. Development of a methodology for the assessment of skills for social regulation of emotions in online learning contexts, development of emotion-centered learning programs.
5. Development of an interdisciplinary research community working on awareness tools for regulation of emotions in CSCL.

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